



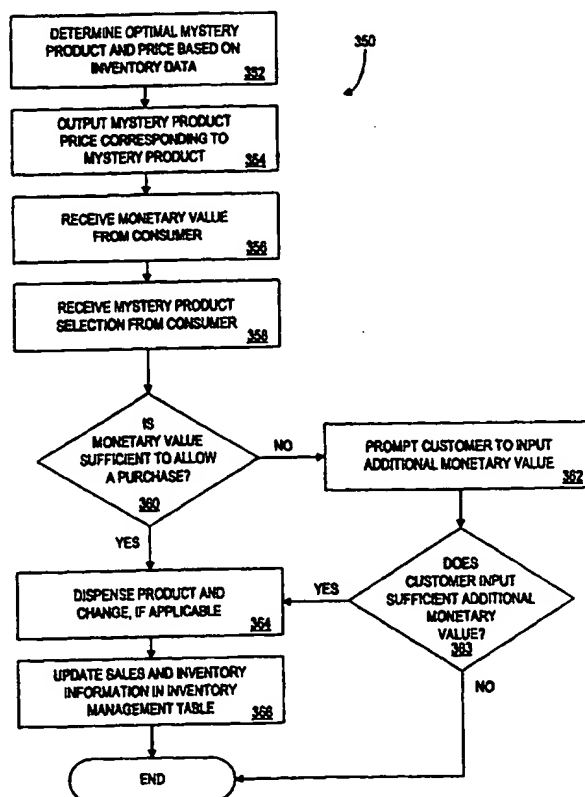
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: <b>PCT/US99/25484</b> (22) International Filing Date: <b>29 October 1999 (29.10.99)</b> (30) Priority Data: 09/218,085      22 December 1998 (22.12.98)      US (71) Applicant (for all designated States except US): <b>WALKER DIGITAL, LLC [US/US]; One High Ridge Park, Stamford, CT 06905 (US).</b> (72) Inventors; and (75) Inventors/Applicants (for US only): <b>WALKER, Jay, S. [US/US]; 124 Spectacle Lane, Ridgefield, CT 06877 (US). TEDESCO, Daniel, E. [US/US]; Apt. 6, 192 Park Street, New Canaan, CT 06840 (US). PACKES, John, M., Jr. [US/US]; 21 Frankford Street, Hawthorne, NY 10532-1950 (US). RATTNER, Charles, A. [US/US]; 240 Wardwell Street, #7, Stamford, CT 06902-5254 (US). MIK, Madgalena [US/US]; 10 South New Street, Greenwich, CT 06830 (US). VAN LUCHENE, Andrew, S. [US/US]; 9 Greenwood Place, Norwalk, CT 06854 (US).</b> (74) Agents: <b>MASCHOFF, Kurt, M. et al.; Walker Digital, LLC, Intellectual Property Dept., One High Ridge Park, Stamford, CT 06905 (US).</b>		(81) Designated States: <b>AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</b>  <b>Published</b> <i>With international search report.</i>	

(54) Title: **METHOD AND APPARATUS FOR VENDING PRODUCTS**

## (57) Abstract

A method and apparatus is disclosed for advancing the sale of vending machine products. The invention enables selling products without revealing the identity of the product. By concealing the identity of the products from a consumer prior to receiving payment, the present invention promotes the automated sale of perishable, slow-selling and/or less profitable products, to increase the overall profitability of a vending machine. Various embodiments are disclosed, including: predetermined price embodiments in which a vending machine sells one or more mystery products for a predetermined price; consumer-specified price embodiments in which a consumer is allowed to specify a price for one or more mystery products; and upsell embodiments in which a vending machine offers one or more upsell mystery products in exchange for the amount of change owed to a consumer, or in exchange for an amount of change owed to a consumer plus an additional monetary value.



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## METHOD AND APPARATUS FOR VENDING PRODUCTS

### Cross-Reference to Related Corresponding Applications

This is a continuation-in-part of commonly owned, co-pending U.S. Patent Application  
5 Serial No. 09/012,163 entitled "Method and Apparatus for Automatically Vending a  
Combination of Products" filed January 22, 1998, commonly owned, co-pending U.S. Patent  
Application Serial No. 08/920,116 entitled "Method and Systems for Processing  
Supplementary Product Sales at a Point-of-Sale Terminal" filed August 26, 1997, and  
commonly owned, co-pending U.S. Patent Application Serial No. 08/947,798 entitled "Method  
10 and Apparatus for Dynamically Managing Vending Machine Inventory Prices" filed October  
10, 1997, the entirety of each incorporated by reference herein.

### Background of the Invention

#### Field of the Invention

15 The present invention is directed generally to vending machines and, more particularly,  
to a method and apparatus for advancing the sale of vending machine products by offering and  
selling discounted products, the identities of the discounted products being revealed after  
receipt of payment.

#### 20 Description of the Related Art

It is believed that the first modern vending machine was installed in the late 1880s. The  
first vending machines were rudimentary devices primarily designed to dispense cigarettes and  
postcards. Modern vending machines are employed to store and dispense a vast array of

merchandise in response to a consumer request and appropriate payment. Such merchandise includes products such as drinks, candy, frozen deserts, snacks, video tapes and children's toys.

Many entrepreneurs are attracted to the basic concept of selling products using a vending machine. Vending machines are generally considered to have significant advantages over traditional merchandising methods. Specifically, vending machines enable the automated sale of merchandise at unconventional locations and times, and require no sales personnel to sell products.

Prior vending machines, however, have several disadvantages when compared to traditional merchandising, particularly relating to inventory control and pricing. With respect to inventory control, one disadvantage is the difficulty of selling or "turning over" an inventory of items that are of low demand, of inferior quality, and/or which are perishable. Although some vending machine suppliers offer to buy back inventory from operators who no longer want to sell certain products, in order to mitigate revenue loss such suppliers often fail to live up to their offer when an operator tries to exercise this option.

Quantity Discounts There have been various attempts to improve inventory turnover using vending machines that encourage consumers to buy larger quantities of a product. Such attempts, as disclosed in patents such as U.S. Patent Numbers 4,008,792; 4,498,570; and 4,679,150 have advanced the art by providing various means that enable a consumer to purchase a product at a quantity discount. These advancements may advantageously encourage additional purchases of an item at a vending machine, but they are likely to affect only consumers who can utilize multiple units of the same product. Further, these inventions do not address the broader problem of improving sales of low demand, low quality or perishable products.

Complementary Products      Some operators have addressed inventory and price management problems by selling complementary products, such as chips and soda, from the same machine.

By selling complementary products, operators hope to passively induce consumers to purchase

5      lower demand products, as certain snacks may be, by placing them in proximity to higher demand products, as certain sodas (e.g. COCA-COLA) may be. Operators may also use this technique to indirectly pair highly profitable products with less profitable ones. The passive nature of this technique, however, limits its effectiveness. Because conventional vending machines do not employ sales personnel, consumers presently are not actively persuaded to  
10      purchase low demand or perishable products.

Inventory Analysis and Control      Other attempts to address problems associated with inventory control include inventory analysis products that employ a proactive approach. These products assist operators in deciding what products to stock, when to restock and at what

15      quantities. Systems, such as a software product entitled "Windows for Vending PRO with Inventory" by Vendmaster and a system described in U.S. Patent number 4,654,800 to Hayashi, have been designed to report product sales data. VendMaster's product is intended to enhance a vending machine operator's ability to identify high-demand inventory and determine preferable times to stock the machine. There have also been attempts to address inventory  
20      control problems through systems that enable operators to remotely monitor inventory and remotely retrieve sales data, such as the system described by U.S. Patent Number 4,412,292 to Sedam et al.

The aforementioned solutions generally attempt to solve inventory problems by allowing operators to monitor and analyze raw sales data. These solutions fail to adequately

address the aforementioned shortcomings of present vending machines. Specifically, these prior systems fail to provide adequate solutions to the problems of maintaining an inventory of perishable items; increasing inventory turnover; and recovering the investment in low demand or inferior quality items.

5           Another attempt to address problems associated with inventory control is described in U.S. Patent Number 5,685,435 to Picioccio. The Picioccio patent is directed to a bulk vending machine having bins that can be used to dispense product mixes selected by a consumer. A “mystery” blend option is also available. Upon selection of the mystery blend option, the vending machine selects a product mix from the available products in accordance with  
10 inventory management practices. The consumer receives the same quantity of product at the same price that would have been paid had the mystery option not been selected. As such, this attempt fails to actively promote the sale of low demand, perishable and less profitable products through any form of reducing pricing schedule and/or perishable product expiration date analysis.

15           Others have attempted to address problems associated with expiring vending machine products. Such attempts have focused on limiting the sale of expired vending machine products. As such, these attempts have not actively promoted the sale of such products through the use of expiration dates to determine a product’s price on a dynamically changing basis. For example, in a product developed by Automated Vending of America, Sunkist Growers, Inc.  
20 and Cavalier known as “The Sunkist Peeled Citrus Machine”, a bar code system is used to prevent dispensing of fruit after its 16 day shelf life. This system does not however make any attempt to advance the sale of products as they approach the end of their shelf life.

A need therefore exists for a method and apparatus that addresses these deficiencies of prior systems. In particular, a need exists for a method and apparatus that monitors supply and

demand of a vending machine inventory and that encourages consumers to purchase low demand, perishable and less profitable products. Further, a need exists for a method and apparatus that determines and dispenses a product based on a monetary amount received from a consumer. The present invention addresses such problems by providing an apparatus and  
5 processing approach that have not previously been proposed.

### **Summary of the Invention**

Generally, according to one aspect of the invention, a method and apparatus are disclosed for offering and selling a product from a vending machine. It is an object of the  
10 present invention to provide a method and system that actively promotes the sale of low-demand and expiring products.

In accordance with the method of present invention, a database of product data is maintained. The product data includes retail price data and minimum acceptable price data for each of the products sold by a vending machine. The method includes identifying a monetary  
15 value available for purchasing a product.

The method further includes a step of selecting a product from among the products in the database based on the monetary value and the minimum acceptable price data associated with the selected product. An offer of the product is output to a consumer via an output device, without revealing the identity of the selected product. The vending machine determines  
20 whether the consumer accepts the offer, and if the consumer accepts the offer, the product is dispensed, thereby revealing the identity of the product to the consumer.

A more complete understanding of the present invention, as well as further features and advantages of the present invention, will be obtained by reference to the following detailed description and drawings.

### Brief Description of the Drawings

A more complete appreciation of the invention and many of the attendant advantages  
5 thereof may be readily obtained by reference to the following detailed description when  
considered with the accompanying drawings, wherein:

Figure 1 is a schematic block diagram illustrating the components of a vending machine  
according to one embodiment of the present invention;

Figure 2 depicts an exemplary inventory management table stored in the memory of the  
10 vending machine of Figure 1;

Figure 3A is a flow chart illustrating the process steps for a series of embodiments in  
which the vending machine of Figure 1 offers a mystery product for sale to a consumer for a  
predetermined price;

Figure 3B is a flow chart illustrating the process steps for an embodiment in which the  
15 vending machine of Figure 1 determines an optimal product to offer as a mystery product,  
determines a price at which to offer the product and completes a transaction in which the  
mystery product is sold to a consumer;

Figure 4 is a flow chart illustrating the process steps for a series of embodiments in  
which the vending machine of Figure 1 offers a mystery product for sale to a consumer at a  
20 consumer-specified price;

Figures 5A and 5B is a flow chart illustrating the process steps for a series of  
embodiments in which the vending machine of Figure 1 offers a mystery product as an upsell  
product to a consumer; and



Figure 6 is a perspective view of an exemplary vending machine constructed in accordance with the present invention.

### **Detailed Description**

5

#### **Definitions**

For the purposes of this specification, the following terms will have the corresponding definitions:

10	<b>Optimal Product:</b>	A product which is selected, based on one or more criteria, for sale to the consumer as a mystery product.
	<b>Product Category:</b>	A product classification for merchandise, such as soda, candy, fruit or musical disc.
	<b>Product Identifier:</b>	Specific product information, such as a product trademark or a
15		code, which uniquely distinguishes a particular product from other products within a product category.
	<b>Retail Price:</b>	A pre-defined price set by a vending machine operator, which is a standard (undiscounted) price at which an item is to be sold.
	<b>Selected Product:</b>	A specific product selected by a consumer in a vending machine
20		transaction.
	<b>Upsell Product:</b>	A second product offered to a consumer for an additional charge, after the consumer has selected a first product.

#### **Apparatus Architecture**

One embodiment of the method and apparatus of the present invention will now be discussed with reference to Figure 1. Figure 1 illustrates the components of one exemplary vending machine 100 including the features of the present invention. Although a specific exemplary vending machine 100 is referred to throughout the detailed description, the present invention is directed to any automatic sales machine that allows payment to be exchanged for goods. Payment can be presented through a variety of media including, but not limited to, coins, bills and other currencies, magnetic stripe cards and smart cards (whether pre-paid or linked to an account), and identification codes.

As shown, vending machine 100 includes an input device 110 for receiving input from a consumer, such as a product selection. Input device 110 may also be used for receiving input from an operator during stocking or maintenance of vending machine 100. Input device 110 preferably includes a set of alpha-numeric keys for providing input to vending machine 100. Alternatively, input device 110 could include a selector dial, a set of buttons associated with a respective set of item dispensers, or any other conventional input device which may be used to receive input from a consumer or operator. Further, vending machine 100 may include more than one input device 110. For example, vending machine 100 may include an exterior input device 110 for receiving consumer input and an interior input device (not shown) for receiving operator input. Input device 110 may provide the dual functionality of receiving input data from both operators and consumers.

Vending machine 100 also includes several mechanisms for receiving payment and dispensing change, including coin acceptor 112, bill validator 114, card reader 116 and change dispenser 118. Card reader 116 may be a conventional reader for reading data on the magnetic stripe of a credit or debit card, and it may cooperate with conventional point-of-sale credit card processing equipment (not shown) to validate card-based purchases through a conventional

transaction authorization network. Alternatively, card reader 116 could be a chip-based "smart card" reader.

Coin acceptor 112, bill validator 114 and change dispenser 118 communicate with currency storage apparatus 120 and may include conventional devices such as Mars models  
5 AE-2400, MC5000, TRC200 or CoinCo model 9300-L. Coin acceptor 112 and bill validator 114 receive and validate currency that is stored by currency storage apparatus 120. Change dispenser 118 activates the return of coinage to the consumer.

With continuing reference to Figure 1, components of vending machine 100, including input device 110, coin acceptor 112, bill validator 114, card reader 116, change dispenser 118,  
10 and currency storage apparatus 120, communicate with, and are controlled by, central processing unit (CPU) 126. CPU 126 may comprise a single processor or several processors operating in conjunction with each other. CPU 126 communicates with communication port 142 for communicating with a central server (not shown). CPU 126 communicates with random access memory (RAM) 128, read only memory (ROM) 130 and clock 132. CPU 126  
15 also communicates with at least one item dispenser 122, at least one output device 124, and data storage device 134.

Output device 124 is preferably a liquid crystal display ("LCD") or a light emitting diode ("LED") display such as the display employed by vending machine model #631  
manufactured by FastCorp and may provide a static message or a scrolling message so as to  
20 provide extensive information using a relatively small display area. Of course, output device 124 could be any conventional device for communicating information, including an audio or video sub-system.

With continuing reference to Figure 1, data storage device 134 is shown which stores an inventory management table 200 and a program 160. Table 200 and program 160 comprise

at least a portion of the data stored by data storage device 134 and are described more fully with reference to Figures 2-5B. Program 160 includes instructions for implementing the steps of the present invention. Data storage device 134 is preferably a magnetic disk drive, but could be a CD drive, optical disk drive, RAM drive or any other conventional storage device.

- 5 Storage device 134 is preferably a secure device which enables only authorized operators to access the inventory management table 200 and program 160.

Although vending machine 100 has been shown with a plurality of components to carry-out the instant invention, one or more of these components can be disposed remotely from the vending machine 100. A plurality of vending machines may be disposed in  
10 communication with a central controller (not shown) which performs one or more of the functions of the structure depicted in Figure 1 for each of the vending machines.

#### Inventory Management Table

Figure 2 illustrates the contents of an exemplary inventory management table 200  
15 stored within data storage device 134 of the present invention. Each record of the table 200 represents inventory data associated with a product dispensed by vending machine 100. In particular, table 200 contains fields for a product identifier 210, a category identifier 212, a dispenser identifier 214, an available inventory 216, a date stocked 218, an expiration date 220, a sales rate 224, a retail price 226 and a minimum acceptable price 230, each of which will now  
20 be described in greater detail below.

The contents of product identifier field 210 identifies a product to be dispensed by vending machine 100. Category identifier 212 stores broad classifications of the products dispensed by the vending machine 100. The contents of this field may be used to identify an optimal mystery product for sale to a consumer according to several embodiments of the

present invention, as discussed further below. Dispenser identifier field 214 stores data identifying a corresponding item dispenser 122.

Inventory management table 200 also includes available inventory field 216 for storing a quantity of available items associated with product identifier 210. Available inventory field 216 is preferably updated by an operator upon stocking vending machine 100 to reflect the number of items stocked. Program 160 includes processing instructions for updating available inventory field 216 upon each sale of a product, to maintain an accurate indication of the quantity of every product. The date stocked field 218 is also updated by an operator upon stocking vending machine 100.

The expiration date field 220 contains the expiration date of products in the available inventory. If the available inventory contains products with different expiration dates, table 200 can be configured to contain a separate product identifier to uniquely identify each different product provided by vending machine 100. An operator preferably arranges products within a dispenser such that the first items to expire are arranged to be dispensed first. For example, with reference to Figure 2, the first two items of table 200 are "BBQ Potato Chips" in dispenser S1. The first two items in dispenser S1 expire on 1/30/99 while the remaining items expire on 2/6/99.

With continuing reference to Figure 2, a sales rate 224 is calculated by the program 160 and maintained in the table 200. Although the sales rate of Figure 2 is shown in terms of items sold per day, the sales rate may be determined in other manners, such as items sold per hour, week or other appropriate period of time, depending on the category of item dispensed. For example, in view of the varying expiration periods for various products, it may be appropriate to determine a sales rate for milk in units of items/hour, while determining the sales rate for candy in units of items/week.

Retail price identifier 226 contains a pre-defined price, set by the vending machine operator, which is the standard retail price at which an item is to be sold from vending machine 100. The minimum acceptable price identifier 230 contains the minimum price for which an item may be sold. The minimum acceptable price may be the wholesale price, or may be greater or less than the wholesale price. In particular, some vendors may determine that it is best to receive any payment for an item prior to an item's expiration date, and therefore may be willing to accept a price below the wholesale price.

Numerous techniques for determining a current dynamic price for merchandise are well known, some of which are disclosed in the commonly owned, co-pending priority U.S. Patent Application Serial No. 08/947,798 entitled "Method and Apparatus for Dynamically Managing Vending Machine Inventory Prices".

#### Mystery Product Vending Process Steps

Having thus described the system architecture and components of the present embodiment, the operation of the system will now be described in greater detail with reference to Figures 3-5B, and with continuing reference to Figures 1 and 2. It is to be understood that the software instructions necessary to provide the functionality described herein are preferably stored in storage device 134 of vending machine 100, but may be stored in ROM 130 or data storage device 134.

In general, the present invention enables a vending machine to automatically manage its inventory by offering consumers mystery products. The vending machine of the present invention is designed to determine an optimal product to sell at a given price, based on dynamically changing sales and revenue data. The identity of the mystery product is concealed from the consumer prior to purchase. As such, the consumer is unaware of specific product information, such as a product trademark, which uniquely distinguishes a particular product. As discussed in greater detail below,

there are several embodiments of the present invention in which the identity of the mystery product is concealed from the consumer until (i) a monetary value is provided by the consumer, (ii) until the consumer agrees to accept the mystery product in exchange for previously provided monetary value, or (iii) until the product is dispensed.

- 5           In general, the embodiments of the present invention can be categorized in three groups: predetermined price embodiments, in which the vending machine sells one or more mystery products for a predetermined price; consumer-specified price embodiments, in which the consumer is allowed to specify a price for one or more mystery products, and upsell embodiments, in which the vending machine offers one or more upsell mystery products in exchange for the amount of change owed to a  
10   consumer, or in exchange for the change plus an input of an additional monetary value.

#### Predetermined Price Embodiments

- With reference to Figure 3A, the process 300 executed in the predetermined price embodiments of the present invention will now be described. In a predetermined price embodiment, vending machine 100 evaluates stored data and determines at least one appropriate product to offer at a fixed  
15   price. For example, vending machine 100 may periodically process a routine to evaluate sales rate, available inventory, expiration date, demand, supply, and/or other data which may be useful in determining a minimum acceptable price. This data is then used to determine at least one “mystery” product to sell at a minimum acceptable price.

- The mystery product may be selected, for example, based on a low sales rate in order to  
20   increase sales, or on an upcoming expiration date in order to prevent a product from spoiling. Of course, the sales evaluation routine may be programmed to identify several optimal “mystery” products to be offered for the minimum acceptable price. An optimal product for sale may be a product within the vending machine having the earliest expiration date, the oldest stock date, the lowest sales rate, the largest inventory, the highest profit margin, the lowest profit margin, and/or some

combination of these and/or other factors. An optimal product may also be a product pre-selected by the operator. Once vending machine 100 determines the mystery product or products, vending machine 100 may display an advertisement of a "mystery" product(s) to be sold at the predetermined minimum acceptable price.

5           Specifically, in an embodiment in which a mystery product is selected on the basis of an early expiration date, CPU 126 of vending machine 100 would execute instructions of program 160 to determine which product of inventory management table 200 has the earliest associated expiration date, as represented by the data stored in expiration date field 220. Record 252, representing "Beet's Fruit Juice," meets the criteria having an expiration date of "1/6/99" which is earlier than the  
10          expiration date stored in all of the other records. Of course, this is only one example, and the specific programming for the selection of mystery products may be tailored to meet the needs of the vending machine operator.

            According to a first predetermined price embodiment, the consumer is given the opportunity to input a specified amount of credit in order to be given a return of a mystery  
15          product. In this embodiment, the product is selected based on sales and inventory data, without regard to a product category. For example, vending machine 100 may output an advertisement such as, "mystery product available for \$0.15."

            Referring to Figure 6, there is illustrated a vending machine 102 which provides a consumer an opportunity to purchase a mystery product at a predetermined price. As shown,  
20          input device 110 includes a plurality of buttons, each button representing a drink selection available to the consumer. Specifically, button 150 enables the consumer to select a "mystery drink." Vending machine 102 further includes a plurality of output devices 124. Each output device 124 displays a predetermined price associated with a drink selection button.



Each output device 124 is a liquid crystal display that may output a predetermined price. Each price may be determined by the operator or dynamically calculated by CPU 126. Specifically, output device 124 associated with button 150 displays "0.45" as illustrated. The price of \$0.45 is calculated according to revenue management based on the available inventory  
5 for all of the available product selections.

According to a second predetermined price embodiment, the mystery product offered by vending machine 100 is selected based on a specific product category. For example, vending machine 100 may select a first mystery product categorized as a "snack" and a second mystery product categorized as a "drink." The advertisement output by vending machine 100  
10 might read "\$0.10 for a mystery snack and \$0.25 for a mystery drink." The items in vending machine 100 can be categorized in any way that machine operator sees to be most practical or profitable.

According to a third predetermined price embodiment, vending machine 100 could offer a consumer a combination or package of products for a fixed price. The group of  
15 products could include a product selected from each category, depending on the types of products that the vending machine sells. In this embodiment, vending machine 100 would offer more than one product to the consumer as a "mystery" package. For example, vending machine 100 might advertise, "50 cents for a mystery meal including a snack and a beverage."

The process begins at step 310 at which vending machine 100 determines at least one optimal  
20 product to offer at a predetermined price. As discussed above, step 310 may include program steps to determine a single mystery product, multiple mystery products, at least one mystery product for each category or a mystery package comprising several products, each based on the factors discussed above. At step 312, an offer for a mystery product is communicated via the vending machine output device 124 to the consumer. The offer communicated by vending machine 100 will be consistent with the

offers described above. Vending machine 100 may, for example, display "\$0.20 for a mystery product" and/or "\$1 for a mystery package of products". In one embodiment of the present invention, mystery product categories may also be displayed to the consumer. As such, the vending machine 100 may display options such as "\$0.25 for a mystery soda", "\$0.30 for a mystery snack", or "\$1 for a  
5 mystery package, including a mystery snack and a mystery drink."

At step 314, vending machine 100 receives a category selection from the consumer, identifying the category of product the consumer wishes to purchase. Of course, not all predetermined price embodiments of the present invention require or permit the consumer to specify a product category. In  
10 embodiments which do not require the consumer to specify a product category, the consumer may simply indicate a desire to purchase a mystery product via input device 110.

At step 316, the vending machine 100 receives a monetary value from the consumer. The monetary value is an amount available for use in making a purchase. Monetary value can be presented through a variety of media including, but not limited to, coins, bills and other currencies, magnetic stripe cards and smart cards (whether pre-paid or linked to an account), and identification codes.

15 At step 318, vending machine 100 receives input representing an acceptance of the offer displayed during step 312. In various embodiments of the present invention, the acceptance may be acknowledged by the consumer, for example, by pressing a "mystery" selection button (not shown), by indicating acceptance via input device 110 or by failing to decline the offer to dispense a mystery product within a predetermined time frame. At step  
20 320, the sufficiency of the monetary value provided by the consumer is confirmed. If insufficient monetary value has been provided, a request for additional monetary value is presented via output device 124. In the event a credit or debit card is used by the consumer, step 320 may include a sub-step of authorizing the transaction.

At step 324, vending machine 100 dispenses the product, revealing the mystery product selection to the consumer. Vending machine 100 further dispenses any change due to the consumer at step 324. At step 326, the sales and inventory information of table 200 is updated to reflect the sale.

With reference to Figure 3B, the process 350 executed in the predetermined price  
5   embodiments of the present invention will now be described. Process 350 begins at step 352  
where vending machine 100 determines, through CPU 126 in conjunction with program 160,  
an optimal mystery product and an optimal price for the mystery product based on inventory  
data stored in table 200. This may be accomplished, for example, by including in program 160  
a series of computer processing instructions to compare the values stored in available inventory  
10   field 216 for each product stored in vending machine 100. In one embodiment, these  
processing instructions may direct CPU 126 that a product with the highest inventory and the  
lowest sales rate is to be selected as the mystery product. The processing instructions may  
further direct CPU 126 that the minimum acceptable price stored in minimum acceptable price  
field 230 be determined based on the disparity between the selected mystery product and  
15   another product in the same category. As will be apparent to one of ordinary skill in the art,  
different factors and formulas may be applied to optimize both product selection and price  
calculation

In one embodiment, CPU 126 may be programmed to calculate a price at which a  
selected mystery product is to be sold during process 350. This price, referred to hereinafter as  
20   the mystery product price, is preferably greater than the minimum acceptable price, which acts  
as a price floor in other embodiments of the invention disclosed herein. In determining this  
mystery product price, CPU 126 may be programmed, for example, to calculate the mystery  
product price as ninety percent of the product's retail price, rounded to the nearest nickel.  
Other formulae may be used, as will be apparent to one of ordinary skill in the art.

Returning to Figure 3B, at step 354, the mystery product price, after being determined in the previous step, is displayed via output device(s) 324. At step 356, vending machine 100 receives a monetary value from a consumer via coin acceptor 112 or bill validator 114. At step 358, the consumer selects the mystery product via input device 110.

5           At step 360, CPU 126 determines the amount of money deposited by the consumer and compares it to the value stored in minimum acceptable price field 230 for the mystery product. If the monetary value is sufficient, process 350 continues at step 364, discussed below. If the monetary value is insufficient, at step 326 CPU 126 prompts the consumer through output device(s) 124 to input an additional monetary value. CPU 126 then determines if the consumer  
10       inputs an additional and sufficient monetary value by monitoring coin acceptor 112 and bill validator 114. If a sufficient monetary value is deposited, process 350 continues to step 364, otherwise process 350 ends.

          At step 364, vending machine 100 dispenses the mystery product via item dispenser(s) 122. At step 366, CPU 126 updates the sales rate information stored in sales rate field 224 and  
15       the available inventory stored in available inventory field 126 corresponding to the product selected as a mystery product. After step 366, process 350 is halted until a next determination of a mystery product is made. This may be done at predetermined time intervals, or in some other manner, as will be apparent to one of ordinary skill in the art.

#### Consumer-Specified Price Embodiments

20           With reference to Figure 4, the process 400 executed in the consumer-specified pricing embodiments of the present invention will now be described. These embodiments begin at step 410 with the receipt of monetary value from a consumer for a mystery product or package. In one embodiment of the present invention, the consumer may also be provided with an opportunity to request a mystery product category, such as a snack or beverage, or several

categories for a package at step 412. Of course, this opportunity to select one or more product categories could be provided to the consumer prior to the vending machine 100 receiving any monetary value.

A determination is then made at step 414 as to whether the monetary value received  
5 from the consumer is sufficient to allow a purchase. This determination may be made in any of a number of ways. This determination may be made based on whether the received monetary value is greater than or equal to at least one minimum acceptable price stored in inventory management table 200. The determination may further be based on the available inventory field of inventory management table 200. In embodiments in which the consumer selects a  
10 product category, the determination may also be dependent on the product category of inventory management table 200. In embodiments in which the consumer selects a mystery package of products, the determination may also be based on the prices for each of several products.

If the consumer has not provided sufficient monetary value to complete a mystery  
15 purchase, the consumer is prompted to input additional monetary value at step 416. In one embodiment, if the consumer refuses to enter additional value in response to the prompt of step 416, the monetary value provided by the consumer is refunded.

If it is determined at step 414 that sufficient monetary value has been provided, vending machine 100 determines an optimal product or package at step 418. This determination may be  
20 made based on the criteria discussed with respect to step 310 of the predetermined price embodiments.

In another embodiment of the invention, the consumer may be provided with a choice of products at step 418, particularly if several products equally qualify as optimal products. In such an embodiment, the specific identity of the product choices may also be revealed to a

consumer who has already provided the necessary monetary value and is now required to purchase one of the choices provided.

The product or package, as well as any change that may be due, is then dispensed to the consumer at step 420. In some cases, vending machine 100 may be one of multiple vending machines that communicate via a network. In such a case, multiple vending machines may operate in conjunction with each other to provide a package, such that a first vending machine may dispense a first product and a second vending machine may dispense a second product. At step 422, CPU 126 updates the sales and inventory information within the inventory management table 200.

Among the consumer-specified price embodiments, there are many embodiments which implement the aforementioned features of the present invention. Many other variations of these embodiments can also be implemented in view of the aforementioned alternatives for the predetermined price embodiments and the following alternatives discussed for the upsell embodiments of the present invention.

#### Upsell Embodiments

With reference to Figures 5A and 5B, process 500 for the upsell embodiments of the present invention will now be described. As previously defined, an upsell product is a product which is offered to a consumer which requires an additional input of monetary value, after the consumer has purchased a first product. In the preferred embodiment, the additional charge is equal to the amount of change owed a consumer (i.e. any excess monetary value remaining after the consumer has purchased a first product). The additional charge for the upsell, however, may be an amount greater than or less than the amount of change due.

With continuing reference to Figure 5A, process 500 for the upsell embodiments begins with processing an initial transaction, illustrated by step 510, in which a consumer makes an initial product selection and provides monetary value for that selection. In one embodiment of the present invention, the selected product is dispensed at step 512. In other embodiments, 5 dispensing of the selected product may be delayed until the process 500 is completed. A determination is then made at step 514 whether any change due to the consumer would support a purchase of a mystery upsell product. Although it is preferable that this determination includes comparing the amount of change due to the minimum acceptable prices in the inventory management table 200, it is to be understood that other prices, such as a 10 predetermined price selected by the vending operator, may be used to make this determination, depending on the programming of the vending machine 100.

If the change due to the consumer is sufficient to support a mystery product upsell, the process determines the optimal product to be offered to the consumer at step 516. As previously discussed, there are a variety of factors which can be utilized to determine whether a 15 product is optimal. In one embodiment, the determination of the optimal product is highly dependent on the product category of the product purchased by the consumer in step 510, so that the optimal product is selected from a complementary product category. For example, if the consumer selected a beverage, the optimal product could be selected from the snack category to complement the consumer's selection of a beverage.

20 At step 518, the optimal product is offered to the consumer as a mystery product for the amount of the change due to the consumer. If the change is sufficient, a package of mystery products may also be offered. Acceptance of the offer may be received in a number of ways, including detecting actuation of a "mystery" selection button 150, receiving acceptance via

input device 110 or detecting a failure to decline the offer to dispense a mystery product within a predetermined time frame.

By detecting a failure to decline the offer within a predetermined time frame, the present invention enables the vending machine to provide a negative option. In accordance therewith, a timer, which can be displayed to the consumer, may be used in step 520 to advance the sale of upsell products. The timer may be controlled by CPU 126 and clock 132 and the time frame may be presented to the user via output device 124. This embodiment gives the consumer a specified time frame to decline the upsell offer. If the upsell offer is not declined within the specified time frame, the mystery product is automatically dispensed to the consumer for the amount of the change. The vending machine 100 can also be configured to influence the consumer to believe that they have won a prize when prompted with the offer. For example, output device 124 may be used to indicate "Congratulations. You qualify for a mystery product in exchange for your change."

If the offer is accepted at step 520, the upsell product is dispensed at step 524, and inventory management table 200 is updated at step 526. If the offer is not accepted at step 520, vending machine 100 dispenses the change due to the consumer at step 522. If the upsell offer is not accepted at step 520, the upsell offer may be repeated several times before proceeding to step 522, preferably with different product categories and prices displayed at each iteration. For example, if a generic upsell offer of "Would you like a mystery product in exchange for your \$0.35 change?" is rejected, another offer may be provided in the form of "Would you like a mystery snack in exchange for your \$0.35 change?" If this offer is rejected, another offer may be provided in the form of "Would you like a mystery beverage in exchange for your \$0.35 change?" The price of the upsell offer may also be reduced, so that a mystery product is offered for only a portion of the consumer's change.

Referring now to Figure 5B, a so-called "upsell plus embodiment" will now be described. If the amount of change due to the consumer is not great enough to support a second purchase, vending



machine 100 may determine the amount of additional monetary value necessary to support a second purchase, such as a mystery purchase, at step 528. Vending machine 100, at step 530, prompts the consumer to input this determined amount of additional monetary value in exchange for a product. At step 532, if the consumer accepts the "upsell plus" offer, process 500 continues to step 534 in which  
5 vending machine 100 receives the determined additional monetary value from the consumer. Vending machine 100 may then determine, at step 536, an optimal upsell product based on the total monetary value (i.e. the change and the provided additional monetary value). The optimal product is dispensed to the consumer at step 538. At step 540, inventory management table 200 is updated, and process 500 is completed.

10 If the upsell plus offer is not accepted at step 532, the offer may be repeated a predetermined number of times with different mystery product categories and/or prices presented for the consumer's consideration at each iteration. If the upsell plus offer is not accepted at step 532, the consumer's change is returned at step 542.

Of course, the upsell embodiment of the present invention is not limited to the process of  
15 Figures 5A and 5B. For example, in another embodiment of the present invention, the vending machine 100 may be configured to determine an optimal product to offer to the consumer for the amount of the change plus some additional monetary value, without first determining whether the change alone will be sufficient to offer the consumer some mystery product. If a perishable item is about to expire, for example, the vending machine 100 may be configured to focus on selling this item,  
20 to the exclusion of other items. As such, the vending machine 100 may offer this product to consumer for the change plus \$0.10, even though another item (which is not about to expire) could have been offered for the amount of the change alone.

In yet another embodiment, the vending machine 100 may be configured to offer alternative mystery products to a consumer, in place of a product selected by a consumer.

For example, if a consumer has inserted \$0.65 (or more) for a selected brand of a \$0.65 snack, the vending machine 100 may offer two mystery snacks to the consumer in place of the selected brand. As with many of the aforementioned embodiments, this may be particularly effective in rapidly advancing the sale of expiring or slow-selling items.

5           It is to be understood that the method and apparatus of the present invention has many applications, and that the present invention is not limited to the representative examples disclosed herein. Moreover, the scope of the present invention covers conventionally known variations and modifications to the system components described herein. Accordingly, the  
10       embodiments described above are provided for illustrative purposes only and do not limit the scope of the present invention, as defined by the appended claims.

What is claimed is:

1. A method for selling a product from a vending machine, the product identity being concealed at the time of offer, the method comprising:

maintaining a database of product data, including normal price data and minimum

5 acceptable price data for each of a plurality of products;

identifying a monetary value available for purchasing a product;

selecting a product from among the plurality of products based on the monetary value and the minimum acceptable price data;

outputting via an output device an offer of the product to a consumer;

10 determining whether the consumer accepts the offer; and

dispensing the product if the consumer accepts the product, thereby revealing the identity of the product to the consumer.

2. The method of claim 1, further comprising receiving the monetary value from the  
15 consumer.

3. The method of claim 2, wherein the step of receiving the monetary value includes receiving a credit card account identifier.

20 4. The method of claim 2, wherein the step of receiving the monetary value includes receiving a smart card identifier.

5. The method of claim 2, wherein the step of receiving the monetary value includes receiving an electronic representation of currency.

6. The method of claim 1, wherein the database further includes category data for each of the plurality of products, and wherein the step of selecting is further based on the category data.

5 7. The method of claim 6, further including receiving a category selection from the consumer.

8. The method of claim 1, wherein the step of selecting a product includes selecting a combination of products.

10 9. The method of claim 1, wherein the step of maintaining includes determining minimum acceptable price data based on sales activity.

15 10. The method of claim 1, wherein the step of identifying includes receiving minimum acceptable price data from an operator.

20 11. The method of claim 1, further comprising the step of determining whether the monetary value is at least as great as the lowest minimum acceptable price, and wherein the step of offering is performed only upon determining that the monetary value is at least as great as the lowest minimum acceptable price.

12. The method of claim 1, wherein the step of determining includes providing a predetermined amount of time during which the consumer may refuse to accept the product.

13. The method of claim 1, wherein the database further includes expiration data for each of the plurality of products and wherein the step of selecting is further based on the expiration data.

5 14. The method of claim 1, wherein the database further includes profitability data for each of the plurality of products and wherein the step of selecting is further based on the profitability data.

15. The method of claim 1, wherein the database further includes demand data for each of  
10 the plurality of products and wherein the step of selecting is further based on the demand data.

16. A method for selling a product from a vending machine, the product identity being concealed at the time of offer, the method comprising:

maintaining a database of product data, including normal price data and minimum

15 acceptable price data for each of a plurality of products;

receiving a first monetary value from a consumer;

receiving a selection of a first product from the consumer;

retrieving a price of the first product from the database of product data;

calculating a second monetary value, the second monetary value being the difference

20 between the first monetary value and the price of the first product.

selecting a second product from among the plurality of products based on the second monetary value and the minimum acceptable price data;

outputting via an output device an offer of the second product to the consumer;

determining whether the consumer accepts the offer; and

dispensing the product if the consumer accepts the product, thereby revealing the identity of the product to the consumer.

17. The method of claim 16, further comprising:

5 calculating an additional amount, the additional amount being the difference between the second monetary value and the minimum acceptable price of the second product; and prompting the consumer to supply funds at least equal to the additional amount.

18. The method of claim 16, wherein the database further includes complementary product  
10 data for each of the plurality of products and wherein the step of selecting is further based on the first product and the complementary product data for the first product.

19. An automatic sales machine for selling a product, the product identity being concealed at the time of offer, the sales machine comprising:

15 a processor;

a memory connected to said processor storing a program to control the operation of said processor;

the processor operative with the program in the memory to:

20 maintain a database of product data, including normal price data and minimum acceptable price data for each of a plurality of products;

identify a monetary value available for purchasing a product;

select a product from among the plurality of products based on the monetary value and the minimum acceptable price data;

output via an output device an offer of the product to a consumer;

25 determine whether the consumer accepts the offer; and

dispense the product if the consumer accepts the product, thereby revealing the identity of the product to the consumer.

20. The automatic sales machine of claim 19, wherein the processor is further operative  
5 with the program in the memory to determine the monetary value received from the consumer.

21. The automatic sales machine of claim 20, wherein the database further includes category data for each of the plurality of products and wherein the step of selecting is further based on the category data.

10

22. The automatic sales machine of claim 19, wherein the processor is further operative with the program in the memory to receive a category selection from the consumer.

15

23. The automatic sales machine of claim 19, wherein the processor is further operative with the program in the memory to select a combination of products.

24. The automatic sales machine of claim 19, wherein the processor is further operative with the program in the memory to determine minimum acceptable price data based on sales activity.

20

25. The automatic sales machine of claim 19, wherein the processor is further operative with the program in the memory to receive minimum acceptable price data from an operator.

25

26. The automatic sales machine of claim 19, wherein the processor is further operative with the program in the memory to determine whether the monetary value is at least as great as

the lowest minimum acceptable price, and to offer the product performed only upon determining that the monetary value is at least as great as the lowest minimum acceptable price.

5 27. The automatic sales machine of claim 19, wherein the processor is further operative with the program in the memory to provide a predetermined amount of time during which the consumer may refuse to accept the product.

28. The automatic sales machine of claim 19, wherein the database further includes  
10 expiration data for each of the plurality of products and wherein the processor is further operative with the program in the memory to select the product based on the expiration data.

29. The automatic sales machine of claim 19, wherein the database further includes profitability data for each of the plurality of products and wherein the processor is further  
15 operative with the program in the memory to select the product based on the profitability data.

30. The automatic sales machine of claim 19, wherein the database further includes demand data for each of the plurality of products and wherein the processor is further operative with the program in the memory to select the product based on the demand data.

20

31. An automatic sales machine for selling a product, the product identity being concealed at the time of offer, the sales machine comprising:

a processor;

a memory connected to said processor storing a program to control the operation of said

25 processor;



the processor operative with the program in the memory to:

maintain a database of product data, including normal price data and minimum acceptable price data for each of a plurality of products;

receive a first monetary value from a consumer;

5 receive a selection of a first product from the consumer;

retrieve a price of the first product from the database of product data;

calculate a second monetary value, the second monetary value being the difference between the first monetary value and the price of the first product.

10 select a second product from among the plurality of products based on the second monetary value and the minimum acceptable price data;

output via an output device an offer of the second product to the consumer;

determine whether the consumer accepts the offer; and

dispense the product if the consumer accepts the product, thereby revealing the identity of the product to the consumer.

15

32. The automatic sales machine of claim 31, wherein the processor is further operative with the program in the memory to:

calculate an additional amount, the additional amount being the difference between the second monetary value and the minimum acceptable price of the second product; and

20 prompt the consumer to supply funds at least equal to the additional amount.

33. The automatic sales machine of claim 31, wherein the database further includes complementary product data for each of the plurality of products and wherein the processor is further operative with the program in the memory to select the product based on the initial  
25 product and the complementary product data for the initial product.

34. An automatic sales machine for selling a product, the product identity being concealed at the time of offer, the sales machine comprising:

means for maintaining a database of product data, including normal price data and minimum acceptable price data for each of a plurality of products;

5 means for identifying a monetary value available for purchasing a product;

means for selecting a product from among the plurality of products based on the monetary value and the minimum acceptable price data;

means for outputting via an output device an offer of the product to a consumer;

means for determining whether the consumer accepts the offer; and

10 means for dispensing the product if the consumer accepts the product, thereby revealing the identity of the product to the consumer.

35. The automatic sales machine of claim 34, further comprising means for receiving the monetary value from the consumer.

15

36. The automatic sales machine of claim 34, wherein the database further includes category data for each of the plurality of products and wherein the means for selecting is further based on the category data.

20 37. The automatic sales machine of claim 34, further comprising means for receiving a category selection from the consumer.

38. The automatic sales machine of claim 34, wherein the means for selecting a product includes means for selecting a combination of products.

39. The automatic sales machine of claim 34, wherein the means for maintaining includes means for determining minimum acceptable price data based on sales activity.

40. The automatic sales machine of claim 34, wherein the means for identifying includes  
5 means for receiving minimum acceptable price data from an operator.

41. The automatic sales machine of claim 34, further comprising means for determining whether the monetary value is at least as great as the lowest minimum acceptable price, and wherein the means for offering is operative only upon determining that the monetary value is at  
10 least as great as the lowest minimum acceptable price.

42. The automatic sales machine of claim 34, wherein the means for determining includes means for providing a predetermined amount of time during which the consumer may refuse to accept the product.

15

43. The automatic sales machine of claim 34, wherein the database further includes expiration data for each of the plurality of products and wherein the means for selecting operates based on the expiration data.

20 44. The automatic sales machine of claim 34, wherein the database further includes profitability data for each of the plurality of products and wherein the means for selecting operates based on the profitability data.

45. The automatic sales machine of claim 34, wherein the database further includes demand data for each of the plurality of products and wherein the means for selecting operates based on the demand data.

5 46. An automatic sales machine for selling a product, the product identity being concealed at the time of offer, the sales machine comprising:

means for maintaining a database of product data, including normal price data and minimum acceptable price data for each of a plurality of products;

means for receiving a first monetary value from a consumer;

10 means for receiving a selection of a first product from the consumer;

means for retrieving a price of the first product from the database of product data;

means for calculating a second monetary value, the second monetary value being the difference between the first monetary value and the price of the first product.

15 means for selecting a second product from among the plurality of products based on the second monetary value and the minimum acceptable price data;

means for outputting via an output device an offer of the second product to the consumer;

means for determining whether the consumer accepts the offer; and

20 means for dispensing the product if the consumer accepts the product, thereby revealing the identity of the product to the consumer.

47. The automatic sales machine of claim 46, further comprising:

means for calculating an additional amount, the additional amount being the difference between the monetary value and the minimum acceptable price of the second product; and

means for prompting the consumer to supply funds at least equal to the additional amount.

48. The automatic sales machine of claim 46, wherein the database further includes

5 complementary product data for each of the plurality of products and wherein the means for selecting operates based on the initial product and the complementary product data for the initial product.

49. A computer-readable storage medium encoded with processing instructions for

10 implementing a method for selling a product from a vending machine, the product identity being concealed at the time of offer, the processing instructions for directing a computer to perform the steps of:

maintaining a database of product data, including normal price data and minimum acceptable price data for each of a plurality of products;

15 identifying a monetary value available for purchasing a product;

selecting a product from among the plurality of products based on the monetary value and the minimum acceptable price data;

offering the product to a consumer via an output device;

determining whether the consumer accepts the product; and

20 dispensing the product if the consumer accepts the product, thereby revealing the identity of the product to the consumer.

50. A computer-readable storage medium encoded with processing instructions for

implementing a method for selling a product from a vending machine, the product identity

being concealed at the time of offer, the processing instructions for directing a computer to perform the steps of:

maintaining a database of product data, including normal price data and minimum acceptable price data for each of a plurality of products;

5       receiving a first monetary value from a consumer;  
receiving a selection of a first product from the consumer;  
retrieving a price of the first product from the database of product data;  
calculating a second monetary value, the second monetary value being the difference between the first monetary value and the price of the first product.

10       selecting a second product from among the plurality of products based on the second monetary value and the minimum acceptable price data;

outputting via an output device an offer of the second product to the consumer;

determining whether the consumer accepts the offer; and

dispensing the product if the consumer accepts the product, thereby revealing the

15       identity of the product to the consumer.

51.     A method for buying a product from a vending machine, the product identity being concealed at the time of purchase, the method comprising:

depositing a monetary value available for purchasing a product;

20       receiving an offer to purchase a product, the product having a concealed identity;

providing an indication of accepting the offer; and

receiving the product.

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100

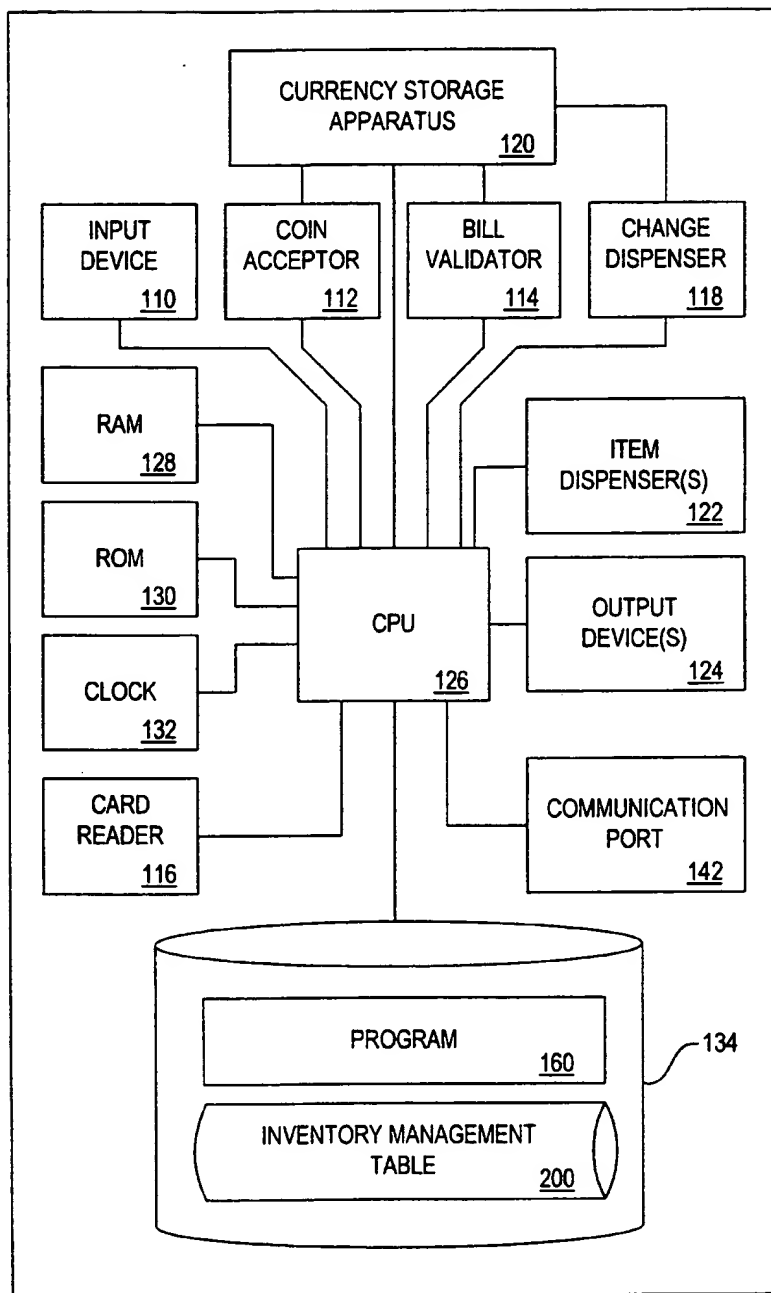


FIG. 1

200

PRODUCT IDENTIFIER 210	CATEGORY IDENTIFIER 212	DISPENSER IDENTIFIER 214	AVAILABLE INVENTORY 216	DATE STOCKED 218	EXPIRATION DATE 220	SALES RATE 224	RETAIL PRICE 226	MINIMUM ACCEPTABLE PRICE 230
BBQ POTATO CHIPS	SNACK	S1	2	12/1/98	1/30/99	1	\$0.50	\$0.50
BBQ POTATO CHIPS	SNACK	S1	10	12/6/98	2/6/99	1	\$0.50	\$0.20
BAKED COOKIES	SNACK	S4	12	12/1/98	1/20/99	5	\$0.40	\$0.40
THUMBS UP SODA	DRINK	B2	4	12/1/98	1/10/99	1	\$0.75	\$0.75
REGULAR BRAND COLA	DRINK	B6	8	12/1/98	1/7/99	6	\$0.75	\$0.45
BEET'S FRUIT JUICE	DRINK	B8	13	12/1/98	1/6/99	1	\$0.70	\$0.25

FIG. 2



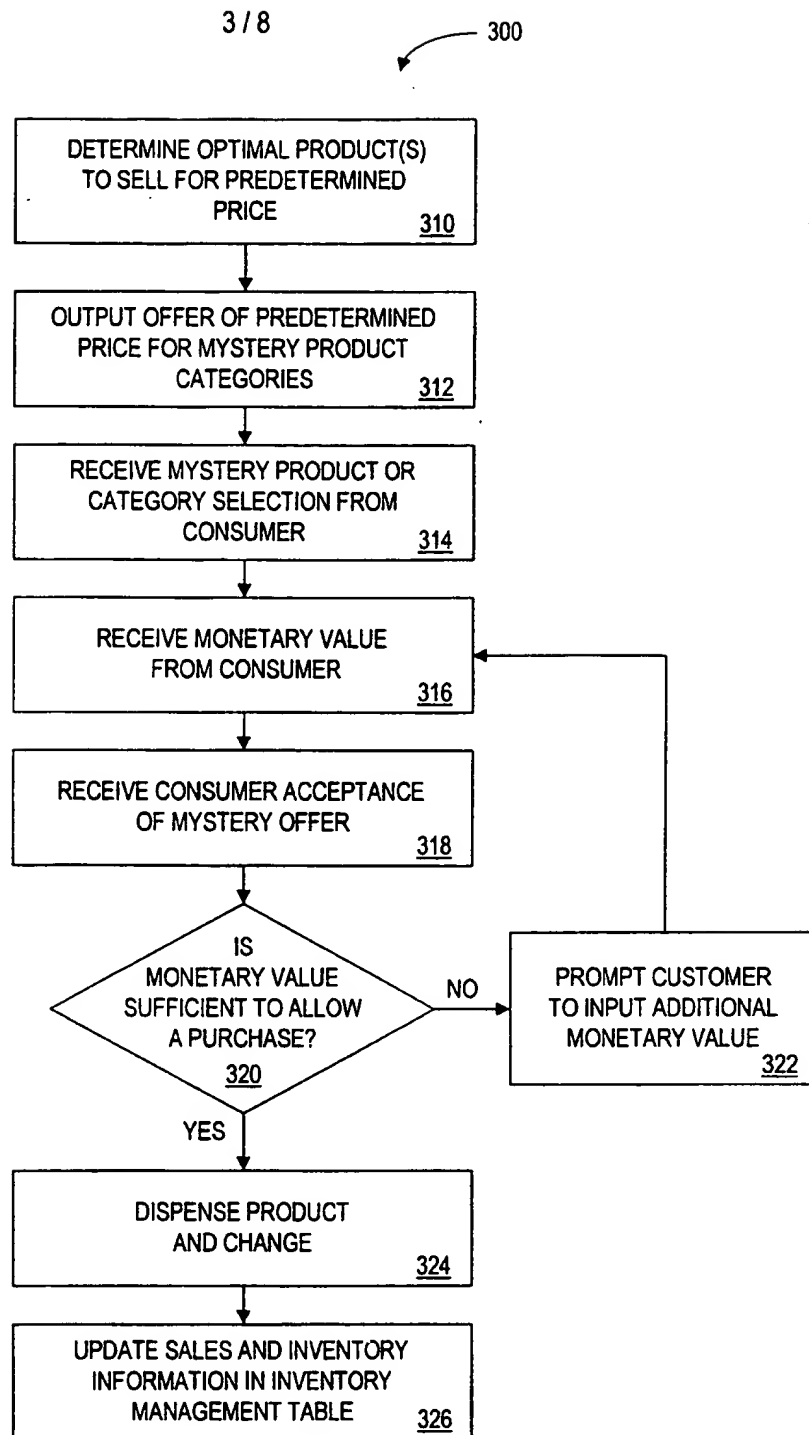


FIG. 3A

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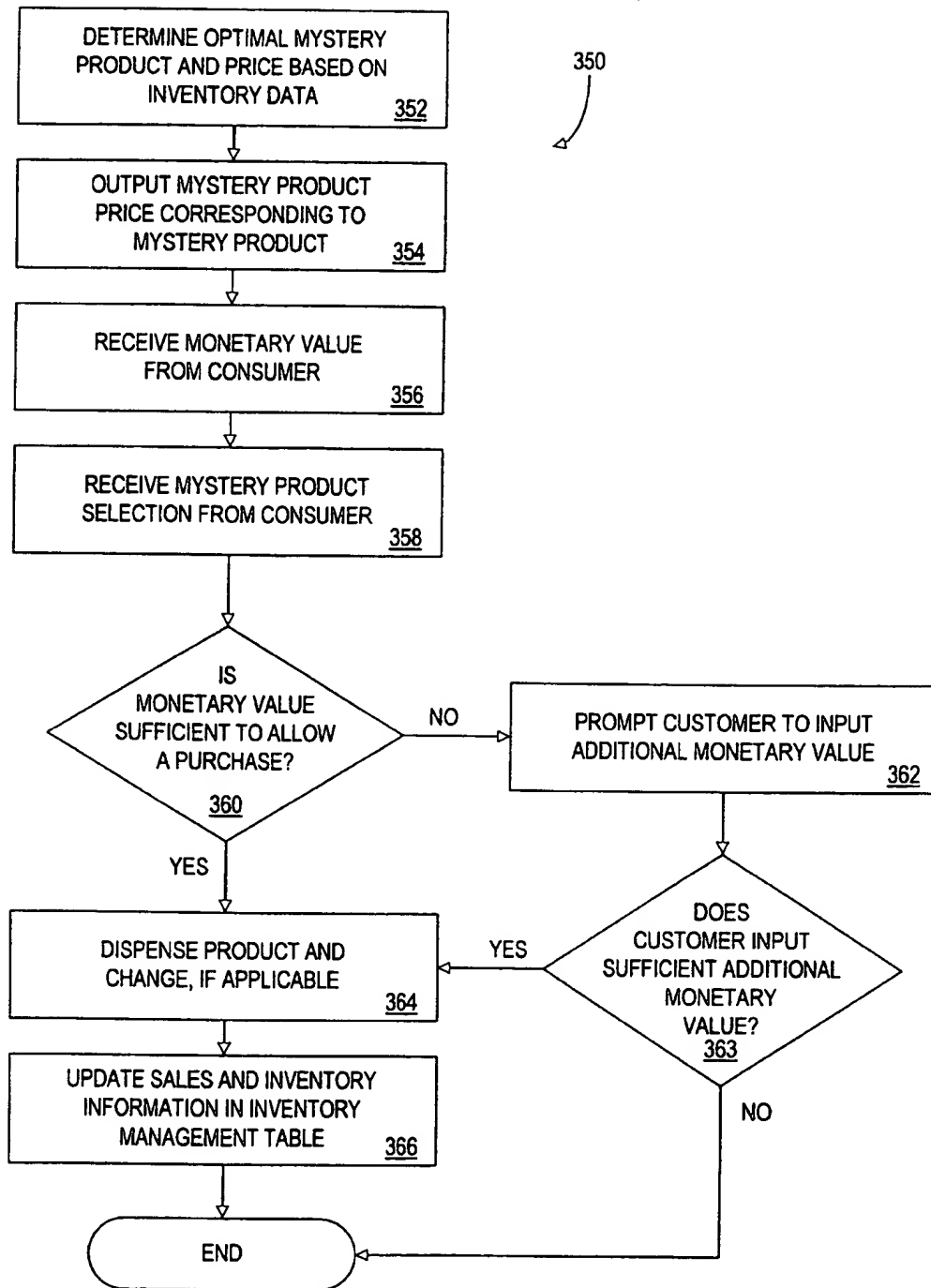


FIG. 3B

5 / 8

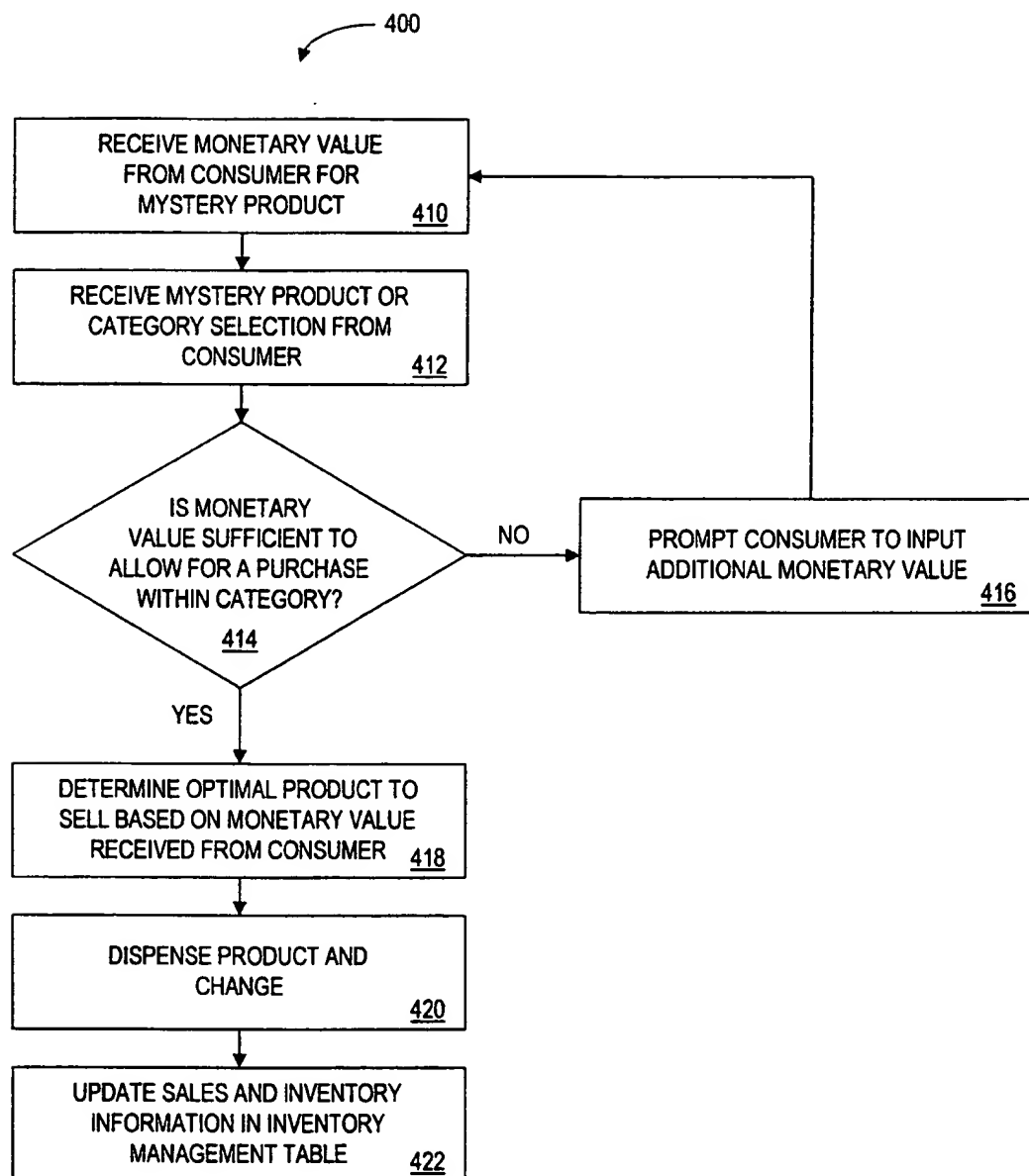


FIG. 4

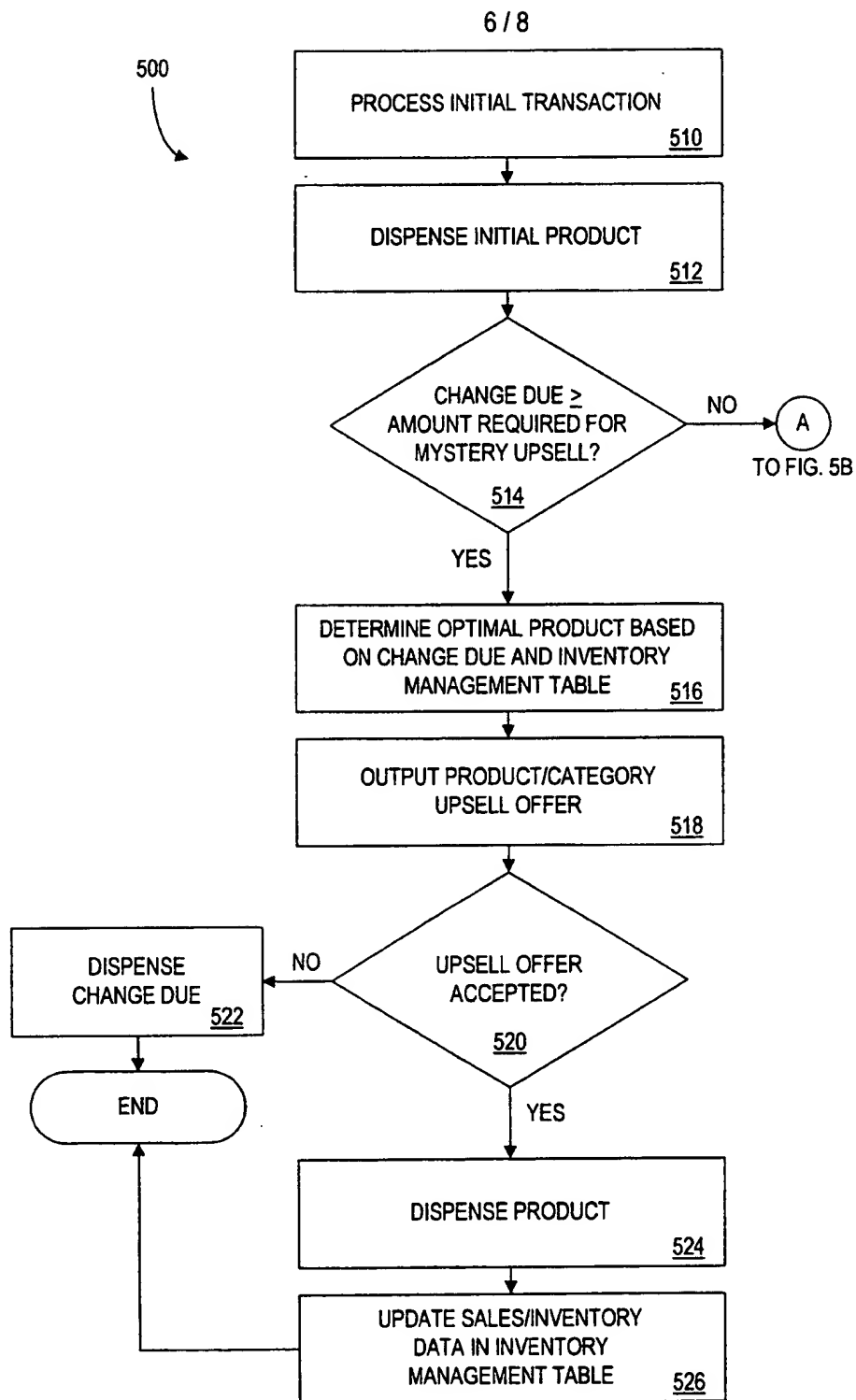


FIG. 5A

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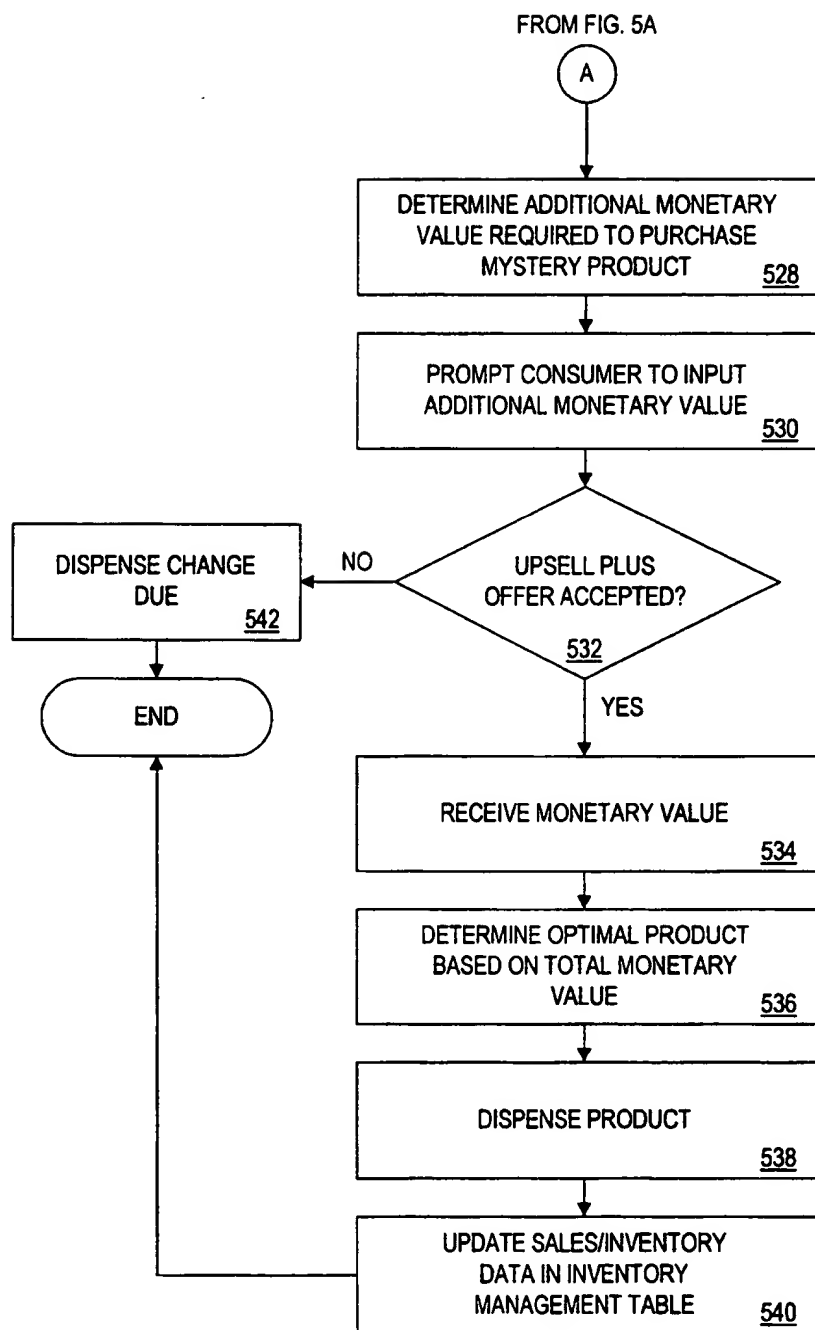


FIG. 5B

8 / 8

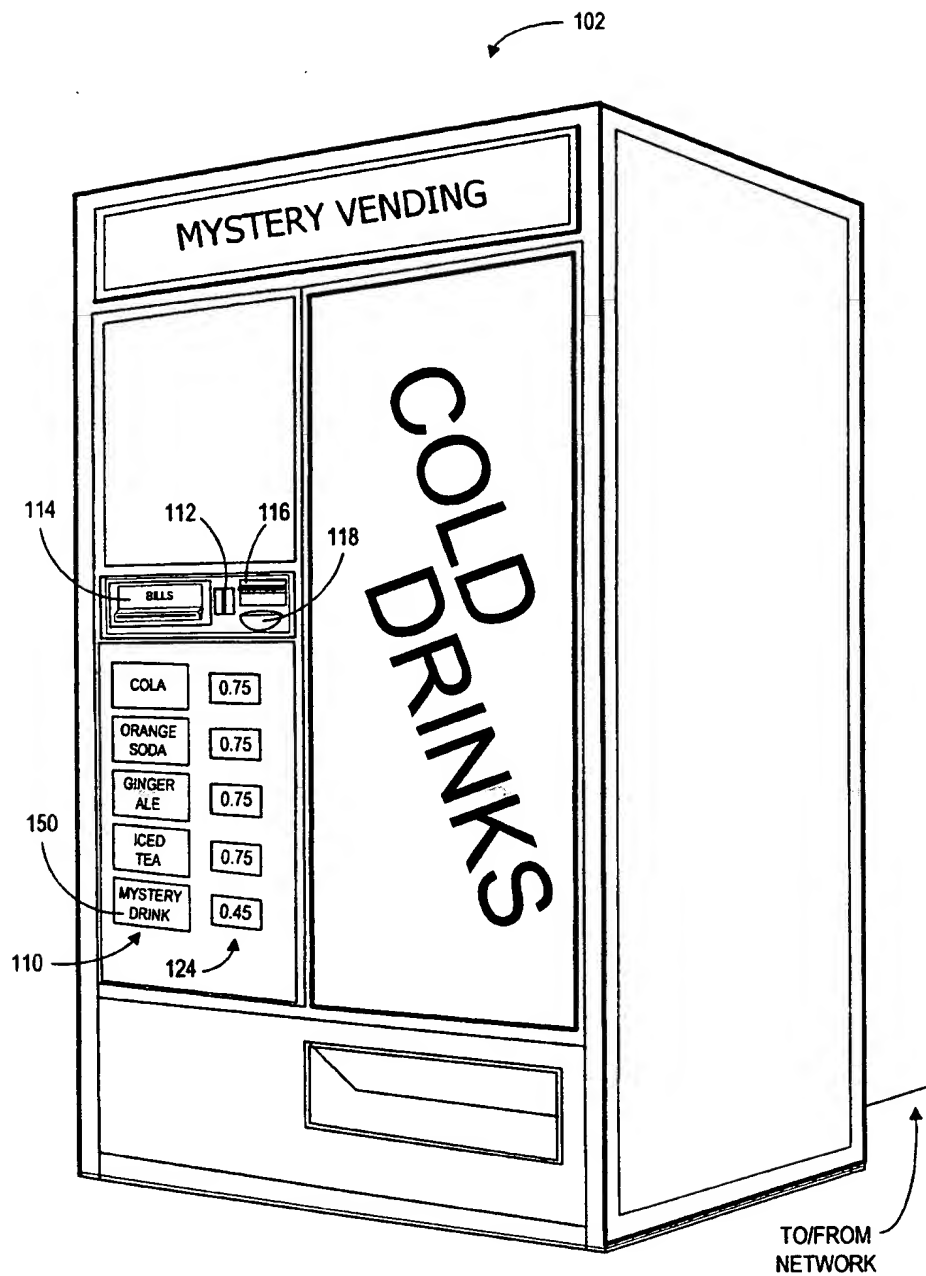


FIG. 6

**PCT/US 99/25484**

IPC 7 G07F9/02

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G07F G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X  A	US 5 685 435 A (PICIOCCIO ET AL.) 11 November 1997 (1997-11-11) cited in the application column 3, line 39 - line 50 column 9, line 55 - column 10, line 3	51  1-5, 10, 13-15, 19, 20, 30, 34, 35, 45, 49
X  A	US 4 518 098 A (FLEISCHER) 21 June 1985 (1985-06-21) column 1, line 28 - line 61	51  1, 2, 34, 35

**Y** Patent family members are listed in annex.

• Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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7. document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

**T** later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention.

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"8" document member of the same patent family

Date of the actual completion of the international search

**1 March 2000**

Date of mailing of the international search report

**08/03/2000**

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**Authorized officer**

Schofield, C

## INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 99/25484

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 862 150 A (IBM) 2 September 1998 (1998-09-02)  column 2, line 12 - line 19	9,13,15, 24,28, 30,39,43
A	US 4 498 570 A (KING ET AL.) 12 February 1985 (1985-02-12) cited in the application column 2, line 62 -column 3, line 39	16,17, 31,32, 46,47,50
A	GB 2 317 257 A (JARVIS ET AL.) 18 March 1998 (1998-03-18)  page 6, line 25 -page 7, line 2; figure 1	1,9,10, 16,19, 24,25, 31,34, 39,40, 46,49,50



# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 99/25484

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		AU 5734896 A	29-11-1996
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